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EFFECTS OF DRUGS ON HUMAN PERFORMANCE - PHASE II  
Third Quarterly Progress Report

by

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## FOREWORD

The work described in this report was authorized under Contract No. DA 18-035-AMC-282(A). This work was started in July 1964 and is in progress. This report covers the period from 1 February to 30 April 1966.

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DIGEST

The aim of the project is the development of a comprehensive battery of ability tests which will evaluate the effects of incapacitating compounds on human performance.

This report summarizes the third quarter's effort on Phase II which included:

1. Completion of Technical Report No. 2, entitled "The effects of drugs on human performance: The development of analytical methods and tests of basic human abilities." Baker, Elkin, Van Cott & Fleishman (March 1966).
2. Modification of tests and test procedures based on the recommendations in Technical Report No. 2, incorporating these modifications into a Test Administrator's Manual.
3. Training of nurses to use the manual in administering and scoring test performance.
4. Conduct of Study IV: The effects of Medical/Psychiatric Classification on group differences in performance (EARL Research Plan 3144).
5. Development of a "social abilities" test for conformity.
6. Planning Study V: Effects of 3580A on selected laboratory and field tests.

I. Study IV: The effects of medical/psychiatric classification on group differences in performance.

As a result of the data analyses from Studies I and II, it became evident that improvements in the test equipment and testing procedures could be made. These improvements were recommended in Technical Report No. 2.\* The report also pointed out that practical considerations surrounding the experiments often led to separating volunteers who were and were not eligible for psychoactive drugs into experimental and control groups respectively, on the assumption that the two groups were comparable in terms of performance. This comparability, however, had never been tested. The report went on to point out the value of testing for comparability, not so much in terms of the absolute level of performance of the two groups, nor on the equality of their variances, but rather, in terms of the comparability in trends over time as a function of factors unrelated to drug effects, per se.

Study IV provided a good opportunity, not only to test this assumption, but to check out the recommended test modifications and to train nurses as test administrators as well.

A pilot version of the Test Administrator's Manual was prepared in February 1966, including standardized instructions and scoring procedures for the tests to be given. The tests included measures of short term memory, gross body equilibrium, dynamic flexibility, time estimation, static strength, manual dexterity, reaction time, explosive strength, and arm-hand steadiness.

During February, a group of 5 nurses from EARL's Medical Research Laboratory was trained in the use of the test manual, and minor revisions were made in instructions in accordance with their recommendations.

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\*Baker, W. J., Elkin, E. H., Van Cott, H. P. & Fleishman, E. A.  
Effects of drugs on human performance: The development of analytical methods  
and tests of basic human abilities. (Report AIR-E25-3/66 TR2) Washington:  
American Institutes for Research, 1966.

Study IV began on March 7 and ended April 21. During this time five 4-man groups were tested, each group completing nine test sessions in a 2-day period. Thus, performance on 10 eligible and 10 ineligible volunteers will be compared on each of the tests.

The data are currently being analyzed and will be reported in Technical Report 4, which will include the details of the experimental procedure, and a further evaluation of the tests used.

## II. Social Testing: Development of a Conformity Test

During the first contract year, it was realized that chemical agents could have potentially significant effects on the interpersonal behaviors of individuals and groups in combat situations. A decision was made to study independence and conformity as a fundamental dimension of social behavior which might be affected by drugs in important and measurable ways. Of special interest would be the changes in individual susceptibility to influence from others, a factor that could seriously affect combat effectiveness. An example of the negative effects of such influence would be an individual's uncritical acceptance of erroneous evaluations of combat situations which he may receive from his fellow soldiers.

In order to assess these effects, the modified Crutchfield conformity apparatus was acquired, and, during the past quarter, a start was made to develop a methodology for its use. The work involved two different aspects: stimulus development and standardization, and development of instructions and procedures for administering the conformity-testing situation.

Stimuli: On the basis of previous research, it was decided to develop two kinds of items which test conformity: perceptual and informational items. Some of these items were based on similar stimuli used in earlier studies, permitting some comparison of data obtained under drugged conditions with data from the prior studies. In addition, new stimuli were developed which had not been employed previously. In all, 19 perceptual and 14 informational stimulus items were prepared and tested.

Standardization procedures: The 33 stimuli were arranged in a random sequence and were presented aurally (for the information items) and visually and aurally (for the perceptual items) to 30 professional and secretarial personnel of the Washington Office of AIR. Under this standardization-testing condition, each individual tested made his judgements alone without knowledge of the responses given by the four other persons seated in adjacent cubicles. Thus, the standardization procedure duplicates the basic situation actually employed in conformity-testing, but without the group pressure treatment, basic in that situation.

On the basis of the study results, a final selection of stimuli for use under drugged conditions was made. The basis of selection was uniformity in difficulty level.

By the end of the current contract year, AIR will prepare for EARL a set of procedures to be used in administering the conformity-test, including an apparatus user's manual.

### **III. Study V Plans: Effects of 3580A on Selected Laboratory and Field Tests**

Planning was begun during this quarter to study the effects of 3580A on existing laboratory performance tests, and on newly developed military criterion tasks.

The laboratory measures will include some of the basic abilities tests developed for the Psychology Branch (e.g., manual dexterity, static strength, short term memory) and some of the performance tests currently used in the Psychopharmacology Branch (e.g., VITA, ZITA, Number Facility). Vital sign measures will also be taken.

The field tests being developed will provide measures of rifle firing and loading, grenade throwing, and gas mask use.

It is anticipated that the results of Study V will provide additional information on the effects of 3580A on human performance, will lead to better understanding of the relationships between drug effects on basic abilities and complex tasks, and will pave the way for future studies predicting drug effects on military tasks from their effects on the underlying abilities.